CLAIMS

We claim:

1. An apparatus for detecting wavelength change of a first light signal comprising:

a. an amplitude splitting interferometer comprising first and second optical paths, the first optical path having a first index of refraction that varies with wavelength over a wavelength band, the second optical path having a second index of refraction that is relatively constant over the wavelength band, such that in operation the first light signal enters and exits the amplitude splitting interferometer, whereby interference light is formed; and

b. a detector optically coupled to the amplitude splitting interferometer such that in operation the detector detects the wavelength change of the first light signal from the interference light.

2. The apparatus of claim 1 further comprising a light modulator coupling the amplitude splitting interferometer to the detector such that in operation a second light signal having a wavelength different from the first light signal is separated from the first light signal by the light modulator.

3. The apparatus of claim 2 wherein the light modulator comprises a diffractive light modulator.

4. The apparatus of claim 3 wherein the diffractive light modulator comprises a grating light valve.

5. The apparatus of claim 2 further comprising a dispersion device coupling the first and second light signals to the amplitude splitting interferometer, the dispersion device spatially separating the first and second light signals.

6. The apparatus of claim 5 wherein the dispersion device comprise a grism.

7. The apparatus of claim 5 wherein the dispersion device comprise a grating.

8. The apparatus of claim 5 wherein the dispersion device comprise a prism.

9. The apparatus of claim 5 further comprising a collimation lens optically coupling the dispersion device to the amplitude splitting interferometer.

10. The apparatus of claim 9 wherein the collimation lens comprises a micro-lens array.

11. The apparatus of claim 9 further comprising a splitter coupling the first and second light signals to the collimation lens, the splitter separating the first and second light signals from first and second transmission light signals, respectively.

12. The apparatus of claim 1 further comprising a light modulator optically coupled to the amplitude splitting interferometer such that in operation a second light signal having a wavelength different from the first light signal is separated from the first light signal prior to the first light signal entering the amplitude splitting interferometer.

13. The apparatus of claim 12 wherein the light modulator comprises a diffractive light modulator.

14. The apparatus of claim 13 wherein the diffractive light modulator comprises a grating light valve.

15. The apparatus of claim 1 wherein the amplitude splitting interferometer further comprises:

a. a first beam splitter optically coupled to first and second entrances of the first and second optical paths, respectively; and

b. a second beam splitter optically coupled to first and second exits of the first and second optical paths, respectively.

16. The apparatus of claim 1 wherein:

a. the first optical path of the amplitude splitting interferometer comprises a first prism; and

b. the second optical path of the amplitude splitting interferometer comprises a second prism joined to the first prism, whereby a beam splitting surface is formed.

17. The apparatus of claim 1 wherein the interferometer produces a fringe pattern and further wherein the detector comprises a detector array such that in operation the detector array detects the fringe pattern in order to measure a power change and the wavelength change.

18. The apparatus of claim 1 wherein the interferometer does not produce a fringe pattern.

19. The apparatus of claim 18 wherein power sensing optics coupled to the detector provide an amplitude change measurement of the first light signal.

20. The apparatus of claim 18 wherein a light signal amplitude adjustment arrangement adjusts an amplitude of the first light signal prior to the first light signal reaching the detector so that the first light signal has a reference amplitude upon reaching the detector.

21. An apparatus for detecting wavelength change of a light signal comprising:

a. means for dividing the light signal into first and second lights;

b. first means for causing the first light to travel along a first optical path having a first index of refraction that varies with wavelength over a wavelength band;

c. second means for causing the second light to travel along a second optical path having a second index of refraction that is relatively constant over the wavelength band;

d. means for combining the first and second lights into an output light, the output light exhibiting a change in interference as wavelength of the light signal changes; and

e. means for detecting the change in the interference as the wavelength of the light signal changes.

22. An apparatus for detecting wavelength jitter comprising:

a. an amplitude splitting interferometer comprising first and second optical paths, the first optical path having a first index of refraction that varies with wavelength over a wavelength band, the second optical path having a second index of refraction that is relatively constant over the wavelength band, such that in operation first and second light signals enter and exit the amplitude splitting interferometer, whereby first and second interference light is formed;

b. a light modulator optically coupled to the amplitude splitting interferometer such that in operation the light modulator separates the second interference light from the first interference light; and

c. a detector optically coupled to the light modulator such that in operation the detector detects wavelength jitter from the first interference light.

23. An apparatus for detecting wavelength jitter comprising:

a. a light modulator such that in operation the light modulator couples to first and second light signals and further such that in operation the light modulator separates the second light signal from the first light signal;

b. an amplitude splitting interferometer coupled to the light modulator, the amplitude splitting interferometer comprising first and second optical paths, the first optical path having a first index of refraction that varies with wavelength over a wavelength band, the second optical

path having a second index of refraction that is relatively constant over the wavelength band, such that in operation the first light signals enters and exits the amplitude splitting interferometer, whereby an interference light is formed; and

c. a detector optically coupled to the amplitude splitting interferometer such that in operation the detector detects wavelength jitter from the interference light.

24. An interferometer comprising:

a. a first beam splitter;

b. a first optical path optically coupled to the first beam splitter and having a first index of refraction that varies with wavelength over a wavelength band;

c. a second optical path optically coupled to the first beam splitter and having a second index of refraction that is relatively constant over the wavelength band; and

d. a second beam splitter optically coupled to the first and second optical paths such that in operation an incident light enters the first beam splitter and exits the second beam splitter, whereby an output light is formed, and further such that in operation a change in wavelength of the incident light within the wavelength band causes a change in interference of the output light.

25. The interferometer of claim 24 wherein the first optical path comprises germanium.

26. The interferometer of claim 24 wherein the second optical path comprises fused silica.

27. The interferometer of claim 24 wherein the interference exhibits a fringe pattern.

28. The interferometer of claim 24 wherein the interference does not exhibit a fringe pattern.

29. An interferometer comprising:

a. means for dividing an incident light into first and second lights;

b. first means for causing the first light to travel along a first optical path having a first index of refraction that varies with wavelength over a wavelength band;

c. second means for causing the second light to travel along a second optical path having a second index of refraction that is relatively constant over the wavelength band; and

d. means for combining the first and second lights into an output light, the output light exhibiting a change in interference as wavelength of the incident light changes.

30. An interferometer comprising:

a. a first prism having a first index of refraction that varies with wavelength over a wavelength band, the first prism including a first total internal reflection surface;

b. a second prism joined to the first prism to form a beam splitting surface, the second prism having a second index of refraction that is relatively constant over the wavelength band, the second prism including a second total internal reflection surface, such that in operation an incident light enters the interferometer and exits the interferometer, whereby an output light is formed, and further such that in operation the output light exhibits a change in interference as wavelength of the incident light changes.

31. The interferometer of claim 30 wherein optical cement joins the second prism to the first prism.